The observational record indicates that current summer sea ice losses appear to be about 30 years ahead of the ensemble of modeled values, which suggests that a transition towards a seasonally ice-free Arctic might occur sooner than the models indicate (J. Stroeve, in litt. to the Service, November 2007). However, Stroeve et al. (2007, pp. 1–5) note that the two models that best match observations over the PM satellite era-CCSM3 and UKMO_HADGEM1 (Hadley Center for Climate Prediction and Research, UK)-incorporate relatively sophisticated sea ice models (McLaren et al. 2006 and Meehl et al. 2006, both cited in Stroeve et al. 2007, pp. 1–5). The same two models were mentioned by Gerdes and Koberle (2007) as having the most realistic sea ice thickness simulations. If only the results of CCSM3 are considered, as in Holland et al. (2006, pp. 1–5), model simulations compare well to actual observations for Arctic ice extent over the PM satellite era, including the rate of its recent retreat, and simulations of future conditions indicate that near ice-free Septembers could be reached within 30–50 years from now. If the record ice losses from the summer of 2007 are considered, it appears more likely the transition towards a seasonal ice cover will occur during the first half of this century (Stroeve et al. 2007, pp. 1–5) (see Figure 7). DeWeaver (2007) cautions that reliance on a multi-model ensemble is preferred to a single model, because the ensemble represents a balance between the desire to focus on the most credible models and the competing desire to retain a large enough sample to assess the spread of possible outcomes.

Projected Changes in Other Parameters

Air Temperature

As previously noted, IPCC AR4 simulations using a multi-model ensemble and the A1B emissions scenario project that, at the end of the 21st century (i.e., the period 2080–2099), the Arctic will be approximately 5 degrees C warmer, on an annual basis, than in the earlier part of 20th century (i.e., the period 1980–1999) (IPCC 2007, p. 904). Larger mean warming of 5.9 degrees C is projected for the A2 scenario, while smaller mean warming of 3.4 degrees C is projected for the B1 scenario. J. Overland (NOAA, in litt. to the Service, 2007) and associates recently estimated Arctic land temperatures north of 60 degrees N latitude out to 2050 for the 12 models selected in Wang et al. (2007, pp. 1,093–1,107). The average warming from this reduced set of models is an increase of 3 degrees C in surface temperatures; the range of model projections is 2–4 degrees C, which is an estimate of the range of uncertainly in scientists' ability to model Arctic climate. An increase in surface temperatures of 3 degrees C by 2050 will have a major impact on the timing of snowmelt timing (i.e., will lead to earlier snowmelt) (J. Overland, NOAA, in litt. to the Service, 2007).

Precipitation

The IPCC AR4 simulations show a general increase in precipitation over the Arctic at the end of the 21st century (i.e., the period 2080–2099) in comparison to the 20th century (i.e., the period 1980–1999) (IPCC 2007, p. 906). According to the AR4 report (IPCC 2007, p. 906), ''the precipitation increase is robust among the models and qualitatively well understood, attributed to the projected warming and related increased moisture convergence.'' Differences between the projections for different emissions scenarios are small in the first half of the 21st century but increase later. ''The spatial pattern of the projected change shows the greatest percentage increase over the Arctic Ocean (30 to 40 percent) and smallest (and even slight decrease) over the northern North Atlantic (less then 5 percent). By the end of the 21st century, the projected change in the annual mean arctic precipitation varies from 10 to 28 percent, with an ensemble median of 18 percent in the A1B scenario'' (IPCC 2007, p. 906). Larger mean precipitation increases are found for the A2 scenario with 22 percent; smaller mean precipitation increases are found for the B1 scenario with 13 percent. The percentage precipitation increase is largest in winter and smallest in summer, consistent with the projected warming. The across-model scatter of the precipitation projections is substantial.

Putkonen and Roe (2003) presented the results of a global climate modeling effort using an older simulation model (from the TAR era) that predicted a 40 percent increase in the worldwide area of land affected by rain-on-snow events from 1980–1989 to 2080–2089. Rennert et al. (2008) refined the estimate in Putkonen and Roe (2003) using daily data from a 5-member ensemble of the CCSM3 for the periods 1980–1999 and 2040–2059. The future scenario indicated increased frequency of rain-on-snow events in much of Alaska and far eastern Siberia. Decreases in rain-on-snow were shown broadly to be due to projected decreases in snow pack in the model, not a decrease in rain events.

Previous Federal Actions

Information about previous Federal actions for the polar bear can be found in our proposed rule and 12-month finding published in the **Federal Register** on January 9, 2007 (72 FR 1064), and the ''Summary of Comments and Recommendations'' section below.

On April 28, 2008, the United States District Court for the Northern District of California ordered us to publish the final determination on whether the polar bear should be listed as an endangered or threatened species by May 15, 2008. AS part of its order, the Court ordered us to waive the standard 30-day effective date for the final determination.

Summary of Comments and Recommendations

In the January 9, 2007, proposed rule to list the polar bear as a threatened species under the Act (72 FR 1064), we opened a 90-day public comment period and requested that all interested parties submit factual reports, information, and comments that might contribute to development of a final determination for polar bear. The public comment period closed on April 9, 2007. We contacted appropriate Federal and State agencies, Alaska Native Tribes and tribal organizations, governments of polar bear range countries (Canada, Russian Federation, Denmark (Greenland) and Norway), city governments, scientific organizations, peer reviewers (see additional discussion below regarding peer review of proposed rule), and other interested parties to request comments. The Secretary of the Interior also announced the proposed rule and public comment period in a press release issued on December 27, 2006. Newspaper articles appeared in the *Anchorage Daily News, Washington Post, New York Times, Los Angeles Times, Wall Street Journal,* and many local or regional papers across the country, as well as local, national, and international television and radio news programs that also notified the public about the proposed listing and comment period.

In response to requests from the public, public hearings were held in Washington, DC (March 5, 2007), Anchorage, Alaska (March 1, 2007), and Barrow, Alaska (March 7, 2007). These hearings were announced in the **Federal Register** of February 15, 2007 (72 FR 7381), and in the Legal Section of the *Anchorage Daily News* (February 2, 2007). For the Barrow, Alaska, public hearing we established teleconferencing capabilities to provide an opportunity to receive testimony from outlying